

November 2004 through January 2005 Status Report

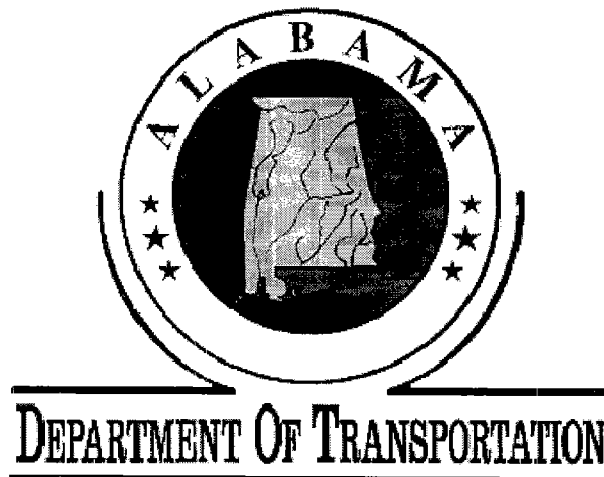
Coliseum Boulevard Plume Investigation

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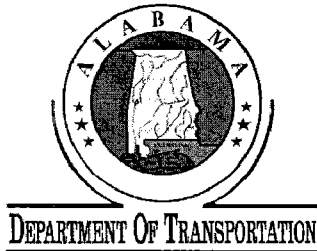
VOLUME I OF II: REPORT

COLISEUM BOULEVARD PLUME INVESTIGATION



March 30, 2005

**Submitted to:
The Alabama Department of Environmental Management
Montgomery, Alabama**

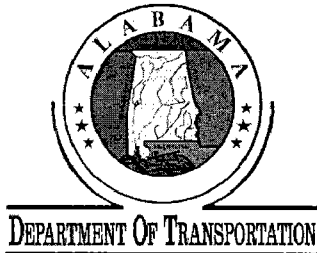


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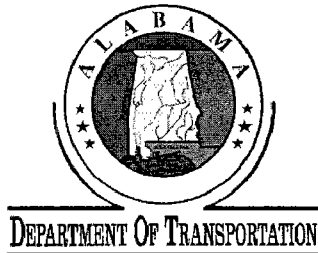
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Summary

During the period between November 1, 2004, and January 31, 2005, investigations at the Coliseum Boulevard Plume (CBP) site continued. Routine monitoring of selected ground-water monitoring wells and continuous multi-channel tubing (CMT) wells, the Kilby Ditch and the Low-Lying Areas were conducted in accordance with the approved plans and are summarized in Section I. Additional site-wide investigations continued in the Probehole (PH) 12 Area using a membrane interface probe (MIP) unit followed by soil and ground water sampling at select locations as outlined in Addendum 14. This report only contains results of samples collected through January 31, 2005. Additional results (collected in February and March 2005) will be included in the next status report. Also during this period, 23 ground water monitoring wells were constructed. All of the wells proposed in Addendum 14 – Additional Site-Wide Investigations were constructed in December 2004 and January 2005; however, development and sampling carried over into February 2005. Section II of this report contains information regarding the work completed by January 31, 2005. Section III contains information about the treated water generated during this period and Section IV contains a summary of quality assurance/ quality control (QA/QC) samples collected during this period.



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I. Routine Monitoring

Water Level Measurements

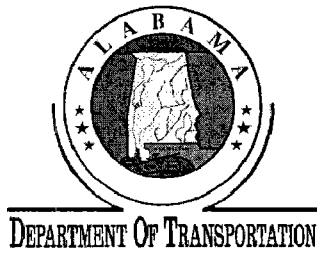
- January 27 and 28, 2005: Depths to ground water were measured in piezometers and monitoring wells associated with the Coliseum Boulevard Plume Investigation. The water level in piezometer PD-109 was not measured on January 28, 2005, because the well was dry. Ground-water elevations on January 27 and 28, 2005, are provided in Tables 1a through 1f. Ground-water elevations on January 27 and 28, 2005, in the 100- and 200-series "shallow zone" monitoring wells and piezometers are shown on Figures 1 and 2, respectively.

Depths to ground water also were measured in continuous multi-channel tubing (CMT) wells 1 through 7 (see Table 2) on January 28, 2005. The water levels were not measured in CMT 3-1 and CMT 4-1 on January 28, 2005, because the wells were dry. Depths to ground water also were not measured in CMT 1-7, CMT 3-7 and CMT 4-7 on January 28, 2005, because of an obstruction in the ports that prevented the water level indicator cable from freely advancing through the ports.

- January 27, 2005: Depths to ground water in monitoring wells MW-101, MW-113, MW-115, MW-130, MW-131 and piezometer PZ-17 were downloaded from mini troll data loggers installed inside of these wells. The piezometer in the zoo pond was last located on April 30, 2003, because it was submerged under water. The piezometer in the zoo pond was located on January 27, 2005, and the mini troll data logger was reinstalled and restarted in the piezometer. The data (water level elevations on a daily basis) from the data loggers are downloaded quarterly.

Semi-Annual Sampling Event (Addendum 13 Work Plan)

- On May 20, 2003, an addendum (Addendum 13) was submitted to the Alabama Department of Environmental Management (ADEM) to modify the ground-water sampling program based on review of analytical data from a full year of monitoring. Concentrations of detected volatile organic compounds (VOCs) had shown very little fluctuation over the preceding year. The alternate monitoring program was approved by the ADEM on August 8, 2003 and is outlined as follows:
 - monitoring wells located in the Probehole 12 and Kilby Ditch areas will be sampled each quarter,
 - wells located around the perimeter of the plume (designated "Perimeter Wells") and the deep zone wells will be sampled annually, and



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- wells outside of the Probehole 12 and Kilby Ditch areas, but interior to the plume (designated "Interior Wells") will be sampled semi-annually. The annual and semi-annual events will be staggered to account for variations of the seasons.

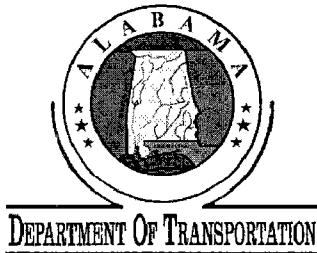
The semi-annual event conducted in January 2005 was comprised of sampling 57 monitoring wells (Probehole 12 Area, Kilby Ditch Area Wells, and Interior Wells) at the Coliseum Boulevard Plume site.

- January 4 through 25, 2005: During the semi-annual event of the approved ground-water monitoring program, samples were collected from the following 57 wells located at the Coliseum Boulevard Plume (CBP) site.

MW-1A	MW-104	MW-209	MW-129	MW-234	MW-238B
MW-2A	MW-204	MW-113	MW-229	MW-135A	MW-238C
MW-3A	MW-105	MW-213	MW-130	MW-235B	
MW-4A	MW-205	MW-124	MW-230	MW-235C	
MW-5A	MW-106	MW-224	MW-131	MW-136A	
MW-101	MW-206	MW-125	MW-231	MW-236B	
MW-201	MW-107	MW-225	MW-132	MW-236C	
MW-102	MW-207	MW-226	MW-232	MW-137A	
MW-202	MW-108	MW-227	MW-133	MW-237B	
MW-103	MW-208	MW-128	MW-233	MW-237C	
MW-203	MW-109	MW-228	MW-134	MW-138A	

These 57 monitoring wells were sampled and analyzed for VOCs, total alkalinity, chloride, nitrate, nitrite, and sulfate by TTL's laboratory and for methane, ethane, and ethene by STL in Burlington, Virginia. The ground-water samples also were measured in the field for ferrous iron and total iron using a CHEMetrics VVR photometer[®]. The results of the analyses of detected VOCs in the ground-water samples collected from the monitoring wells are provided in Table 3. The results of the analyses for total alkalinity, chloride, nitrate, nitrite, sulfate, ferrous and total iron, methane, ethane, and ethene in the ground-water samples are provided in Table 4. The concentrations of detected VOCs in ground-water samples collected from the monitoring wells are shown on Plate 1 and Figure 3. Laboratory reports of the results of the analyses of the ground-water samples collected during the month of January 2005 are provided on the attached compact disc - recordable (CD-R).

Prior to sample collection, the monitoring wells were purged using a bladder pump until field parameters (pH, conductivity, and turbidity) stabilized. Temperature and redox (ORP) were also measured in the field. The field parameter measurements during purging of the monitoring wells in the month of January 2005 are provided on the Monitoring Well Sampling Forms on the attached CD-R.



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- January 2005: Ground-water samples were collected from 13 monitoring wells (MW-2A, MW-106, MW-206, MW-107, MW-207, MW-130, MW-230, MW-225, MW-228, MW-131, MW-231, MW-133 and MW-233) and analyzed for total organic carbon (TOC). The results of these analyses are provided in Table 5. Laboratory reports of the results of the analyses for TOC in the ground-water samples collected during the month of January 2005 are provided on the attached CD-R.

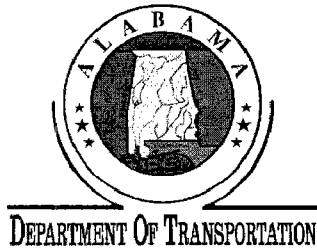
Quarterly Sampling of the Continuous Multi-Channel Tubing (CMT) Wells

- January 24 through 28, 2005: Ground-water samples were collected from CMT wells 1, 2, 3 and 4. Ground-water samples were not collected from CMT 1-4 (on 1/28/05), CMT 3-1 (on 1/26/05) and CMT 4-1 (on 1/27/05) due to the lack of sufficient water in the CMT ports. After measuring depths to water, each port was purged using a peristaltic pump until field parameters (pH, conductivity, and turbidity) stabilized. Ground-water samples also were measured in the field for temperature, oxidation-reduction potential [redox (ORP)], ferrous [Fe (II)] and total iron. Approximately 2 to 6 gallons of water were removed from each of the CMT ports prior to sample collection. During sample collection, the tubing from the pump was disconnected and withdrawn from the port.

The water samples were collected by draining the water from the bottom end of the tubing (end previously inside the port) into the sample containers. The ground-water samples were analyzed for VOCs, total alkalinity, chloride, nitrate, nitrite, and sulfate by TTL's laboratory and for methane, ethane, and ethene by STL. Results of analyses of detected VOCs in the ground-water samples collected from the CMT wells are provided in Table 6. The results of the analyses for total alkalinity, chloride, nitrate, nitrite, sulfate, ferrous and total iron, methane, ethane, and ethene are provided in Table 7. Laboratory reports of these analyses and copies of monitoring well sampling forms are provided on the attached CD-R.

Surface Water Sampling

- January 26, 2005: Surface water samples were collected from the west and main branches of Kilby Ditch at five locations (compliance points CP-1, CP-2, CP-3, and monitoring points MP-1 and MP-2). On January 26, 2005, the surface water samples were collected at each location from the central part of the ditch. Figure 4 shows the locations of these five sampling points. The water samples were placed on ice and transported to TTL's laboratory for analyses for VOCs. Results of analyses of detected VOCs are provided in Table 8. The laboratory reports for the VOC analyses of the surface water samples collected on January 26, 2005, are provided on the attached CD-R. During sample collection, the water samples also were measured for temperature, pH, conductivity, dissolved oxygen, and turbidity (see Table 9).



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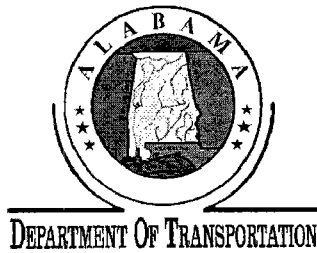
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On January 26, 2005, compliance point water samples CP-1, CP-2, and CP-3 contained 28.9 µg/L (micrograms per liter), 13.1J µg/L, and 2.7J µg/L of trichloroethylene (TCE). The J-flag associated with the concentration means the concentration is below the calibration curve, but above the detection limit. TCE concentrations detected in the samples collected from CP-1, CP-2 and CP-3 on January 26, 2005, are below the action level concentration of 175 µg/L for TCE in surface water.

Surface water samples at locations MP-1 and MP-2 contained TCE (78.7 µg/L and 48.5 µg/L, respectively) on January 26, 2005. There also was detection of 1,1-Dichloroethene (1.7J µg/L) and cis-1,2-Dichloroethene (8.3J µg/L) in the surface water sample collected from MP-1 on January 26, 2005.

Low – Lying Area (Addendum 04 Work Plan)

- January 31, 2005: On January 31, 2005, soil/sediment and surface-water samples were collected at all sixteen locations (A through P) in the "Low-Lying Area". Results of the analyses for VOCs in the soil/sediment and surface water samples collected on January 31, 2005, are provided in Tables 10 and 11, respectively. Laboratory reports of these analyses are provided on the attached CD-R.

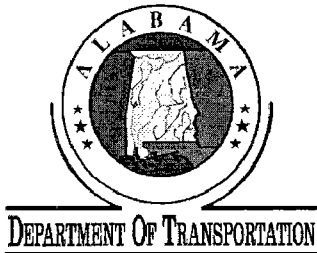


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II. Additional Site-Wide Investigations

- On February 13, 2004, an addendum (Addendum 14) was submitted to the ADEM to conduct additional site-wide investigations. The additional site-wide investigations plan was approved by the ADEM and is outlined as follows:
 - quantify, via aquifer testing, the hydrogeologic characteristics of the first water-bearing zone near the confluence of the west Kilby Ditch with the main Kilby Ditch,
 - quantify, via aquifer testing, the hydrogeologic characteristics of the first water-bearing zone in the southwest quadrant of the Coliseum Boulevard Plume (CBP) Site,
 - construct "nested" monitoring wells to characterize the vertical distributions of TCE and hydraulic gradients in selected areas within the CBP Site,
 - delineate the outermost boundaries of the TCE plume in selected areas,
 - delineate a "lobe" of TCE that is outside the Probehole 12 Area,
 - verify the horizontal extent of the area that has been determined to contain at least 10,000 parts per billion (ppb) of dissolved TCE within the Probehole 12 Area,
 - characterize further the horizontal and vertical distributions of dissolved TCE within the area encompassed by the 10,000 ppb contour of the Probehole 12 Area, and
 - evaluate the concentrations of TCE within the 10,000 ppb contour to assess zones and/or areas that might contain residual TCE.
- November 18, 2004, through January 31, 2005: On September 30, 2004, field investigations were begun to determine the extent of residual liquid TCE, if any, in the subsurface within the Probehole 12 area. These investigations incorporate the use of a Membrane Interface Probe (MIP), which comprises a soil-conductivity probe and a membrane that is permeable to molecules of TCE. The soil-conductivity probe is used to characterize lithologies qualitatively and the permeable membrane is used to detect liquid TCE. The MIP probe is configured so that molecules of TCE can be conveyed to the land surface for analysis with a gas chromatograph that is equipped with both a photoionization detector and an electron-capture detector. Responses from both detectors are recorded continuously as the probe is pushed/hammered into the subsurface. After completion of several MIP "pushes", a geoprobe was used to collect samples of soil and ground water for comparisons to the MIP responses. Locations of MIP pushes conducted during the months of November 2004 (locations A19, A20, A21, A22, A23, A24, and A25), December 2004 (A26, A27, A28, A29, A30, A31, A32, A33, A34, A35, A36, A37 and A38), and January 2005 (A39, A40, A41, A42, A43, A44, A45, A46, A47, A48, A49, A50, A51, A52, A53, A54, A55, A56, A57 and A58) are shown on

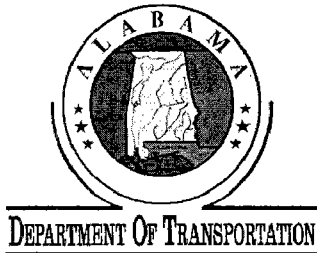


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Figure 7. When soil/ground-water samples were collected, an additional probehole was pushed about 5 feet from the MIP probehole. The soil samples were preserved, in the field, with methanol. The concentrations of TCE within the soil samples subsequently are being analyzed with the computerized model "NAPANAL" to check for the presence of liquid TCE. Two ground-water samples were collected during field activities from the sample location identified as A14 in the area of Broadway Street on November 1, 2004, and were analyzed for VOCs. (Note: Additional soil and ground-water samples were collected in February and March 2005 and will be reported in the next status report.) The results of the analyses for VOCs in the ground-water samples are provided on Table 12. Laboratory reports of these analyses and copies of the MIP logs are provided on the attached CD-R. During this work interval (November 2004 through January 2005) 35 MIP probeholes were completed. This work is on-going and a full report will be prepared at the conclusion of the investigation.

- December 2004 and January 2005: Ten nested monitoring wells (MW-143A, MW-243B, MW-144A, MW-244B, MW-244C, MW-145A, MW-146A, MW-246B, MW-147A, MW-247B, MW-148A, MW-248B, MW-248C, MW-149A, MW-249B, MW-249C, MW-150A, MW-250B, MW-250C, MW-151A, MW-251B, MW-152A, and MW-252B), and two pump test wells (PW-3 and PW-4) were installed at the CBP project site. The locations of these new nested wells and pump test wells are shown on Plate 1. Conductivity logs for the shallow nested monitoring wells (MW-143A, MW-144A, MW-145A, MW-146A, MW-148A, MW-149A, MW-150A, MW-151A, and MW-152A) installed in December 2004 are provided on the attached CD-R. The construction table for the new wells is provided on Table 13, and the boring logs for these wells are provided on the attached CD-R. During January 2005, monitoring wells MW-145A, MW-146A, MW-246B, MW-147A, and MW-247B were developed and ground-water samples were collected and analyzed for VOCs, total alkalinity, chloride, nitrate, nitrite, sulfate, methane, ethane, and ethene analyses. The ground-water samples also were measured in the field for ferrous iron and total iron using a CHEMetrics VVR photometer®. Results of analyses of detected VOCs in the ground-water samples collected from monitoring wells MW-145A, MW-146A, MW-246B, MW-147A, and MW-247B are provide on Table 3. The results of analyses for total alkalinity, chloride, nitrate, nitrite, sulfate, ferrous and total iron, methane, ethane, and ethene are provided on Table 4. These concentrations also are shown on Plate 1. Laboratory reports of these analyses and copies of the monitoring development and sampling forms are provided on the attached CD-R.
- January 17, 2005: On January 17, 2005, a sludge sample was collected from the sanitary sewer north of the Materials and Test Bureau for VOC analyses adjacent to MIP location A-48. The sample did not contain detectable concentrations of TCE on January 17, 2005. There were detectable concentrations of 1,2,4-Trimethylbenzene [44.4 mg/Kg (milligram per kilogram)], 4-Isopropyltoluene (1,290 mg/Kg) in the sludge sample. The results are provided on the attached CD-R.



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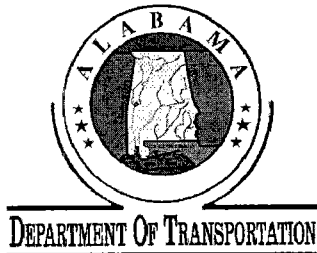
III. Investigation Derived Waste

Soil Cuttings

- Soil cuttings from probeholes and construction of monitoring wells were placed in a lined roll-off box at the Central Staging Area for storage until the roll-off box is properly disposed.

Water Treatment

- December 2004 and January 2005: Water accumulated during cleaning of sampling equipment, and purging and sampling of monitoring wells, was treated through a liquid-phase carbon filter treatment system at the ALDOT staging area. A total of 8,840 gallons of water was treated during the months of December 2004 and January 2005 (see Table 14). The treated water was discharged into the sanitary sewer at the staging area. During treatment of the water, samples were collected from water discharged from the first carbon filter to monitor for breakthrough and the third carbon filter to monitor for compliance with the Montgomery Water Works and Sanitary Sewer Board discharge requirements. The water samples were submitted for VOC analyses. Results of analyses of detected VOCs and volumes of treated water are provided in Table 14. Laboratory reports of the analytical results for samples collected in December 2004 and January 2005 are on the attached CD-R.



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IV. Quality Assurance/Quality Control

- During the January 2005 semi-annual ground-water sampling event, duplicate ground-water samples were collected from monitoring wells MW-124, MW-203, MW-206, MW-230, and MW-238C and analyzed for VOCs, total alkalinity, chloride, nitrate, nitrite, sulfate, methane, ethane, and ethene. The duplicate sample results are shown with the parent sample results (see Tables 3 and 4). Ground-water samples also were collected from MW-5A, MW-134 and MW-224 and shipped to **TTL**'s laboratory to be analyzed for total iron for quality assurance/quality control purposes (see Table 4). Equipment rinse samples were collected and trip blank samples accompanied water samples that were submitted for analyses for VOCs in months of November and December 2004 and January 2005. Results of analyses of detected VOCs in the rinse and trip blank samples are provided in Table 15. Laboratory reports of the analyses are provided on the attached CD-R.